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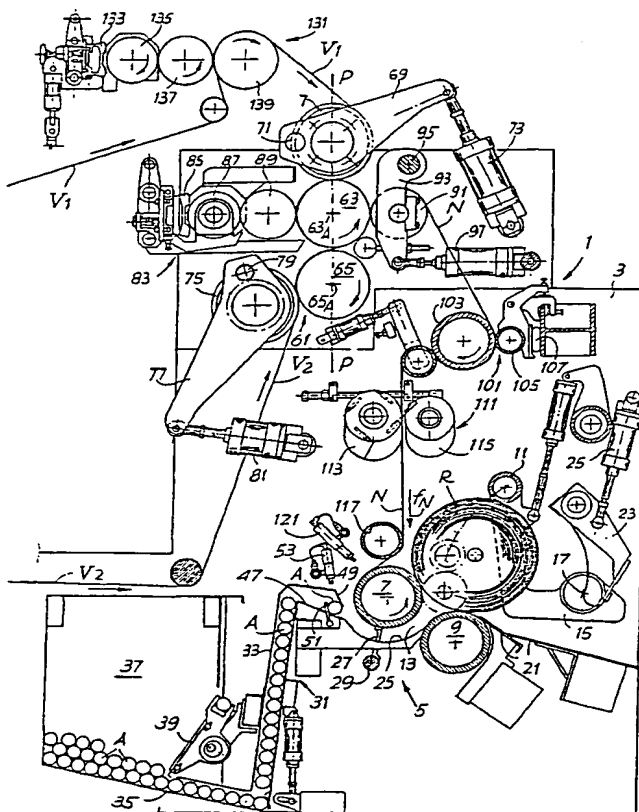
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(54) Title: **COMPACT REWINDER FOR FORMING ROLLS OF WOUND-UP WEBLIKE MATERIAL AND ASSOCIATED METHOD**



(57) Abstract: A rewinding machine for the production of rolls of wound-up weblike material is described, comprising; a winding-up system (7, 9, 11); a system (27) for severing the weblike material (N) which, on completion of the winding-up of each roll (R), severs the weblike material, forming a free final edge and a free initial edge; an adhesive applicator (121) for applying the adhesive intended to seal the free final edge of the weblike material of each roll before the roll is unloaded from the winding-up system.

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"COMPACT REWINDER FOR FORMING ROLLS OF WOUND-UP WEBLIKE
MATERIAL AND ASSOCIATED METHOD"

DESCRIPTION

Technical field

5 The present invention relates to a rewinding machine for the production of rolls of wound-up weblike material, for example rolls intended for the production of small rolls of toilet paper, kitchen towel and the like.

 In particular, but not exclusively, the invention relates to a rewinder of the peripheral or superficial type, that is to say one in which the roll or log
10 being formed is retained in rotation in a winding-up cradle by means of winding-up members which are in contact with the roll being formed over its peripheral surface, transmitting thereto the rotational winding-up movement.

 The invention also relates to a winding method which can be implemented on the abovementioned rewinder.

15 State of the art

 In the paper converting industry, use is frequently made of machines known as winders or rewinders, which receive an incoming weblike material coming from a parent reel or plurality of parent reels, to wind it up in the form of rolls or logs of diameter equal to the diameter of the finished product and
20 great length. These rolls or logs are subsequently cut orthogonally to their axis to form small rolls of toilet paper, kitchen towel and the like.

 Machines of this type, based on the peripheral winding-up procedure, are described and illustrated, for example, in: US-A-4 723 724, US-A-4 856 725, US-A-4 828 195, US-A-4 962 897, US-A-4 487 377,
25 US-A-4 931 130, US-A-5 248 106, US-A-5 368 252, GB-A-2 105 688, WO-A-94/21 545. Machines based on the central or mandrel winding-up procedure are described in US-Re-28 353, US-A-3 532 572, US-A-3 552 670, US-A-3 567 552, US-A-3 734 423.

 The rewinding machines are normally designed on a large scale and
30 operate at very high speeds. In particular, the present trend is toward producing rewinding machines suitable for processing weblike material of ever-increasing width.

 In some applications, however, it would be appropriate to have

rewinding machines of modest size available, in particular to meet the needs of emerging markets where high production speeds are not necessary.

To meet these needs, a peripheral rewinding machine of particularly modest size has been developed and is described in WO-A-97/32 804. This
5 rewinding machine provides a special winding-up system, with means of gluing the final free edge of the roll located downstream of the winding-up cradle. Normally, the unloading of the finished log and its gluing require a cyclical slowing of the production line in order to obtain correct positioning of the free edge of the weblike material to be glued in order to seal the roll.

10 Objects and brief description of the invention

It is an object of the present invention to provide a machine, especially but not exclusively of the peripheral or superficial type, of modest size, and therefore particularly easy to transport and such as to take up little space when in use.

15 According to a particular aspect, it is also an object of the invention to produce a compact machine in which the feed speed of the weblike material need not be reduced at the end of each winding-up cycle.

Substantially, these and other objects and advantages, which will be clear to the person skilled in the art from reading the text that follows, are
20 achieved in a rewinding machine equipped with a winding-up system, generally of the central or peripheral type, and with a system for severing the weblike material at the end of each winding-up cycle in order to generate a final edge and an initial edge, wherein an adhesive applicator applies the adhesive to the final free edge of each roll in a position upstream of the roll in
25 the final phase of winding-up in the winding-up system.

Normally, contrary to what is envisaged by the present invention, the adhesive for sealing the free edge is applied to the final edge or to the roll downstream of the winding-up system, when the roll has been unloaded from said system. For this purpose, suitable gluing machines are usually provided,
30 disposed in line with the rewinding machine, optionally with the interposition of a storage unit. This makes the line complex and bulky.

According to the invention, conversely, the adhesive is applied to an end portion of the weblike material before the latter is wound up onto the roll

and before the roll is unloaded from the winding-up system. This makes the machine more compact and enables other advantages to be achieved, which will become clear in due course.

US-A-4 487 377 describes a system in which the adhesive is applied
5 to the final edge of the weblike material before completion of the roll. However, in this case, the adhesive is not applied by an applicator directly onto the weblike material. To the contrary, it is delivered onto a winding-up core and the latter, when it is inserted into the winding-up system, transfers some of the adhesive applied thereto to the final edge in order to achieve
10 sealing thereof. This known solution has significant limitations.

Specifically, it is applicable only with special winding-up systems and only with certain systems for severing the weblike material and introducing new winding-up cores. Furthermore, it is not applicable in cases where the winding-up takes place without a central core. It should also be borne in mind
15 that it is not always possible or appropriate to use the same adhesive for the final free edge of a roll and to anchor the initial free edge to the winding-up core in order to initiate the winding-up of the subsequent roll.

These limitations are overcome by the present invention.

According to a particularly advantageous embodiment of the invention,
20 the adhesive is applied to the weblike material before the latter is cut, torn or otherwise severed by the severing system. This may take place, for example, by disposing the adhesive applicator upstream of the severing system. However, in principle, it would also be conceivable to dispose the adhesive applicator downstream of the area in which the severing system acts or on
25 the severing system itself.

Although the winding-up system may be of any kind, including the central type (i.e. the type in which the winding-up movement is imparted to the roll by means of a central mandrel around which the material is wound up), according to a particularly advantageous embodiment of the invention
30 the winding-up system comprises a peripheral winding-up cradle. In this case, the adhesive applicator may be disposed upstream of the winding-up cradle, for example facing one of the winding-up rolls which form part of said cradle.

By comparison also with the more compact rewinding machines

described in WO-A-97/32 804, the present invention provides the possibility of a further reduction in the bulk of the machine and the possibility of achieving a high level of reliability and precision in gluing, even without temporary reductions of the feed speed of the weblike material.

5 Furthermore, it is possible to wind up even rolls of large diameter. This is possible because, once the adhesive has been applied, before completion of the winding-up of the final free edge of the roll, the latter performs a rotation in the winding-up cradle and subsequently on an unloading surface to exert pressure on the final free edge and stabilize the latter for gluing to
10 the final turn of the roll. In practice, the roll may also perform a complete revolution in the winding-up cradle before being unloaded, so that at the time of unloading the final free edge has already been pressed against the last turn of the roll.

In the traditional systems, conversely, this operation requires -
15 especially in the case of rolls of large diameter - very long rolling surfaces in order to ensure that pressure is always exerted on the final free edge, and hence large bulk.

In practice, the adhesive applicator may comprise one or more nozzles disposed side by side to spray the necessary dose of adhesive onto the
20 weblike material. However, different systems for applying the adhesive, for example a contact system with brush or pad members which touch the weblike material, transferring the necessary adhesive thereto, are not ruled out, although the use of nozzles is advantageous because it is simpler in design and from the standpoint of maintenance and preparation, as well as
25 being more flexible.

In a practical embodiment, the winding-up cradle may possess a winding-up system comprising a first winding-up roller and, optionally, a second and a third winding-up roll, in accordance with a technology known per se, although the possibility of a different configuration of the winding-up
30 cradle is not excluded.

When at least a first winding-up roller is provided, the spray nozzle or nozzles which apply the adhesive in order to seal the free edge of the weblike material are disposed, relative to the first winding-up roll, in a manner such as

to spray the adhesive onto the weblike material when the latter is supported
by and moved around said winding-up roll. The means for severing the
weblike material are advantageously disposed downstream, in the direction of
movement of the weblike material, relative to the position of the spray nozzles
5 which apply the adhesive.

The rewinding machine may be of the type which winds up onto
tubular cores, but the possibility is not excluded of applying the same criterion
to rewinding machines which produce rolls of weblike material wound-up
without a central winding-up core, using known winding-up techniques
10 described, for example, in EP-A-0 580 561 and EP-A-0 611 723.

According to a further aspect of the present invention, a particular
configuration of an embossing and laminating unit is also proposed, of
particular compactness, capable of being inserted into a rewinding machine
of modest size. According to this aspect of the invention, the embossing unit
15 has a first and a second embossing cylinder and a first and a second
pressure roller, the embossing cylinders and the pressure rollers being
supported by the side frames which also support the perforating unit, the
winding-up cradle of the rewinding machine, particular compactness thereby
being achieved.

20 In practice, a reduction in bulk may advantageously be obtained by
placing the embossing cylinders one above the other vertically, in a manner
such that the first embossing cylinder is located above the second embossing
cylinder, for example and advantageously (but not necessarily) with the axes
placed one above the other in a vertical plane. In this case, the first pressure
25 roller is positioned above the first embossing cylinder, while the second
pressure roller is disposed below the second embossing cylinder, but offset
laterally relative to the plane containing the axes of the embossing cylinders,
which plane may advantageously and preferably (but not necessarily) be
approximately vertical. In this configuration, the winding-up cradle is situated,
30 relative to the plane in which the axes of rotation of the embossing cylinders
lie, on the side opposite that on which the second pressure roller is located.
In this manner, as will become clear from the detailed description of an
example of embodiment, a configuration of particularly reduced size is

achieved.

A system for combining the plies that constitute the weblike material may be associated with the embossing unit. For example, a ply-bonding unit may be provided. In an alternative embodiment, an adhesive dispenser may be provided which, in a manner known per se, applies an adhesive to one of the two plies of the weblike material, after the ply has been embossed. In this case, the adhesive dispenser is advantageously disposed above the second pressure roller, again in order to obtain a very compact configuration. The possibility of disposing both an adhesive dispenser and a ply-bonding unit in the same machine, so as to permit the user to employ both methods, is not excluded.

The invention also relates to a winding-up method for the production of rolls of weblike material.

Further advantageous features of the machine and method according to the invention are indicated in the attached claims.

Brief description of the drawings

The invention will be better understood by reference to the description and the attached drawing, which shows a practical, nonlimiting example of said invention. In the drawing:

Fig. 1 shows a lateral view of the rewinder according to the invention; and

Figs. 2 to 4 show successive phases of the winding-up cycle.

Detailed description of the preferred embodiment of the invention

A detailed description will be given below of a particularly advantageous embodiment of the invention, complete with accessories and elements which may also, in part, be omitted. The embodiment illustrated is of the type having tubular winding-up cores on which the individual rolls are formed, but, as stated previously, the machine may also be designed for winding-up without a tubular core.

The rewinder, generally designated 1, comprises side frames 3 on which is mounted a winding-up cradle, generally designated 5, and comprising in the example shown a trio of winding-up rollers 7, 9 and 11. The first winding-up roller 7 forms, together with the second winding-up roller 9, a

gap 13 through which the weblike material and the roll pass at the start of the phase of formation around the respective winding-up core A.

The first winding-up roller 7 receives the weblike material N from an unwinder (not shown). The third winding-up roller 11 is mounted on an arm
5 15 oscillating about an axis 17 in order to adapt to the increase in size of the roll being formed. Downstream of the winding-up cradle is disposed an unloading chute 21 with a roll-stopping device 23 controlled by an actuator 25, which intervenes to stop the movement of the rolls and unload, in a controlled manner, the individual rolls delivered to the winding-up cradle
10 along the chute 21.

Below the first winding-up roller 7 extends a curved rolling surface 25 along which the winding-up cores A roll in the first phase of winding-up of the weblike material N, in accordance with a technology known and described in detail in WO-A-94/21.545, to which reference is made for more descriptive
15 details. Reference 27 designates an element for severing the weblike material, which rotates in a controlled manner about an axis of rotation 29 and interacts with the first winding-up roller 7 to perform the severing of the weblike material at the end of the winding-up of each roll, so as to generate a final free edge, which is eventually wound onto the roll just completed, and an
20 initial free edge which is caused to adhere to the next winding-up core.

The winding-up cores A are fed to the winding-up cradle 5 by means of a feeder 31 which comprises a re-emergence guide for the cores A, designated 33. The tubular cores A are inserted into the re-emergence guide 33 from below, sliding or rolling along a base surface 35 of a hopper 37 in
25 which is also located an agitator 39 that prevents the cores from becoming jammed. The cores are unloaded individually onto the unloading surface 47 and retained in the waiting position by an elastic blade 49.

A rotating inserter 51, synchronized with the rotation of the severing means 27, acts to push each tubular core A into the channel defined by the
30 rolling surface 25 and the first winding-up roller 7, at the start of each winding-up operation.

Above the surface 47, in alignment with the holding position of the cores A before insertion into the channel between the rolling surface 25 and

the first winding-up roller 7, are disposed a plurality of first nozzles 53 which apply to the temporarily waiting tubular core A the adhesive necessary for the adhesion of the initial free edge of the weblike material. As an alternative to the gluing system, other systems may be used, for example suction or
5 electrostatic systems or others known in the art.

Along the path of the weblike material N coming from the unwinder (not shown) is disposed an embossing and laminating unit generally designated 61 and comprising a first embossing cylinder 63 rotating about an axis of rotation 63A and a second embossing cylinder 65 rotating about an
10 axis of rotation 65A. The two embossing cylinders, made for example from steel or another hard material, have surface tips or protuberances which perform the embossing of the material.

Interacting with the first embossing cylinder 63, which is in a position approximately vertically above the second embossing cylinder 65, is a first
15 pressure roller 67 supported by an arm 69 hinged at 71 and pressed against the embossing cylinder 63 by means of an actuator 73. Interacting with the second embossing cylinder 65 is a second pressure roller 75 supported by an arm 77 hinged at 79 and pressed against the embossing cylinder 65 by means of an actuator 81. As can be seen in Fig. 1, the three axes of rotation,
20 of the embossing cylinders and of the pressure roller 67, are approximately vertically one above the other, in other words they lie in a common vertical plane shown by the line P-P. Conversely, the axis of rotation of the pressure roller 75 is offset and is located, relative to the plane in which the axes of rotation 63A, 65A of the embossing cylinders 63, 65 lie, on the opposite side
25 from the winding-up cradle. A particularly compact configuration is thus obtained.

The first and second embossing cylinders 63, 65 and the respective pressure rollers 67 and 75 are supported by the same side frames 3 that support the members forming the winding-up cradle.

30 Interacting with the first embossing cylinder 63 is an adhesive dispenser 83, comprising in this example a distributor 85, a first screened cylinder 87 and a second plate cylinder 89, in contact with the ply of material passed around the first embossing cylinder 63 in order to apply, in a manner

known per se, an adhesive to the embossed protuberances of the ply generated on the surface of the embossing cylinder 63. The adhesive dispenser is located above the pressure roller 75.

Also interacting with the first embossing cylinder 63 is a coupling or
5 laminating roller 91 supported by an arm 93 hinged at 95 and stressed against the embossing cylinder 63 by means of a piston-and-cylinder actuator 97. By means of this, the two plies, separately embossed on the two embossing cylinders 63, 65, are coupled by lamination after the application of the adhesive.

10 Two plies of weblike material, designated V1 and V2, are fed to the embossing and laminating unit 61 and are embossed separately, the first between the embossing cylinder 63 and the pressure roller 67 and the second between the embossing cylinder 65 and the pressure roller 75. The ply V2 is then detached from the second embossing cylinder 65 and placed
15 gently on the first ply V1 passed around the first embossing cylinder 63. The two plies, thus placed one above the other, are laminated between the first embossing cylinder 63 and the laminating roller 91 to form the weblike material N. An application of adhesive being provided by the dispenser 83, the lamination results in the two plies V1 and V2 being bonded one to the
20 other.

In the example of embodiment shown, there is provided along the path of the weblike material N coming from the laminating/embossing unit 61 a ply-bonding unit 101 comprising a cylinder 103 with which interact ply-bonding rollers 105 stressed under pressure against the cylinder 103 by means of one
25 or more expansion boxes 107 which are expanded to high pressure. The ply-bonding unit 101 may be used in addition to the embossing unit 61, for example when the latter is operating without adhesive, because it lacks the dispenser 83 or because the latter has been taken out of service. This does not exclude the possibility that the machine lacks the embossing unit 61 and
30 is equipped only with the ply-bonding unit 101 which provides the coupling of the two plies V1, V2, appropriately transported to the ply-bonding unit 101, for example by being passed around the roller 91. It is also possible to arrange that the ply-bonding unit 101 is entirely absent and that the machine is

supplied solely with the embossing and laminating unit 61, with the associated adhesive dispenser 83. In this case, the path of the weblike material N will be slightly modified.

Along the path of the weblike material N, between the ply-bonding unit 5 101 and the winding-up cradle 5, a perforating unit 111 is provided, comprising a rotating blade-supporting roller 113 and a fixed roller 115 bearing a counter-blade. The perforating unit 111 may be of the traditional type and is not described in detail.

The weblike material N which passes through the perforating unit 111 10 is provided with a series of perforation lines orthogonal to the longitudinal course of the weblike material N, which perforation lines subdivide the weblike material N into a series of slips or sheets for subsequent use by the end consumer.

The perforated weblike material N coming from the perforating unit 111 15 is passed around a cylinder 117 and, from there, around the first winding-up roller 7 in order to be passed to the winding-up cradle.

Interacting with the first winding-up roller 7 is a series of spray nozzles 121 which serve to apply an adhesive to the weblike material N in order to perform the sealing of the final free edge of the weblike material at the end of 20 the winding-up of each individual roll, following the severing of the weblike material by the severing member 27.

As clearly illustrated in Fig. 1, the nozzles 121 (which are provided in appropriate numbers and suitably spaced to ensure correct gluing also of areas over the length of the roll, in other words over the width of the weblike 25 material) are disposed in a manner such as to spray the adhesive onto the weblike material at the desired moment, before said weblike material passes into the channel defined by the winding-up roller 7 and the rolling surface 25, and thus before the member 27 for severing the weblike material acts upon it. In this way, the adhesive, subsequently intended to seal the roll, is applied to 30 the weblike material before the latter is severed.

Expediently, the nozzles 121 may be mutually spaced relative to one another in a manner such that the adhesive distributed thereby does not affect those areas of the weblike material N with which the severing member

27 is in contact, in a manner such that the latter does not become contaminated with adhesive during each winding-up cycle.

More expediently, moreover, contamination of the severing member 27 by the adhesive sprayed by the nozzles 121 can be prevented with appropriate timing of the actions of the two members. Specifically, as is known from the prior art, the severing member 27 may be phased, relative to the perforation lines produced by the perforating unit 115 on the weblike material N, in a manner such that the weblike material is severed by tearing at a position between the roll being wound up between the rollers 7, 9 and 11 and the point of contact between the severing member 27 and said weblike material, in other words the point at which the weblike material is pinched between the severing member 27 and the first winding-up roller 7. Since the adhesive applied by the nozzles 121 is to remain on the end part or tail of the weblike material which is being wound up on the roll being completed, the spray nozzles 121, the perforator 111 and the severing member 27 may be mutually phased in a manner such that the severing action performed by the severing member 27 on the weblike material takes place when the perforation along which the weblike material parts as a result of the pinching action of the severing member 27 is located at a sufficient distance from the area of action of said member 27, so that the adhesive previously sprayed by the nozzles 121 onto the weblike material is reliably outside the area of contact between the weblike material and the severing member 27.

While the foregoing has provided a description of the possibility of using a series of spray nozzles 53 to apply an adhesive to the tubular cores A before the latter are inserted between the rolling surface 25 and the winding-up roller 7, this does not exclude the possibility that the adhesive necessary for anchoring the initial free edge of the weblike material to the winding-up core A is applied by said nozzles 121. To this end, provision may be made for the latter to be actuated twice, once in order to apply the adhesive to the area of weblike material N which, after the severing performed by the severing member 27, will form the tail or final end of the roll, and a second time to the weblike material which will enter into contact with the tubular winding-up core A. In this case also, provision being made for interrupting the delivery of the

adhesive by the spraying nozzles 121, it will be possible to prevent contamination of the severing member 27 by the adhesive. In practice, the severing member will act between two linear areas of adhesive, the more forward one in order to seal the finished roll and the more rearward one in order to initiate the subsequent winding-up.

The use of two series of nozzles 53 and 121 is expedient when the adhesives used for sealing the final edge of the roll and anchoring the initial edge to the core are of different nature and features. This depends on the type of product wound up and/or the winding-up speed.

Figs. 2, 3 and 4 show three consecutive phases in the operation of winding-up a roll of weblike material.

In Fig. 2, the roll R is in an intermediate phase of formation. A new core A, in this example, has already been positioned for subsequent insertion. Fig. 3 shows the phase of completion of the winding-up of the roll, with the separating member which rotates in the direction of the arrow f27 and enters the channel defined between the rolling surface and the upper winding-up roller 7. The nozzles 121 spray the adhesive necessary for the sealing of the final edge. Fig. 3 also shows the phase of delivery of the adhesive to the new core A by the nozzles 53 on the weblike material N before its severing. This delivery may be simultaneous or staggered in time, and in particular advanced, by comparison with the delivery by the nozzles 121. Fig. 4 shows the subsequent phase, in which a new core A has already been inserted into the channel defined between the rolling surface 25 and the winding-up roller 7, in contact with said rolling surface and with the weblike material N passed around the winding-up roller 7. Downstream of the severing member, the weblike material N has been torn to form a final edge LF which eventually becomes wound up onto the roll R, and to which the adhesive C has been applied by the spray nozzles 121. LI designates the initial edge which is wound up onto the new core. The unloading of the roll R from the winding-up cradle takes place in a manner known per se.

In the example shown, the machine also has a printing unit, generally designated 131 and comprising an ink 133, a screened cylinder 135 and a plate cylinder 137 which bears the plate on which is engraved the design,

decoration, text or other information to be printed on the weblike material. In this example, only the ply V1 of the weblike material N is caused to pass onto the return cylinder 139 with which the plate cylinder 137 interacts, while the other ply V2 is passed, without printing, to the embossing unit or, possibly,
5 directly to the ply-bonding unit.

It is understood that the drawing shows only a simplification of the invention, provided by way of a practical demonstration, and that it may be varied in shapes and arrangements without thereby departing from the scope of the concept underlying said invention.

10

CLAIMS

1. A rewinding machine for the production of rolls of wound-up weblike material, comprising:

- a winding-up system;
- 5 - a system for severing the weblike material which, on completion of the winding-up of each roll, severs the weblike material, forming a free final edge and a free initial edge;
- an adhesive applicator for applying the adhesive intended to seal the free final edge of the weblike material of each roll;

10 characterized in that said adhesive applicator applies the adhesive to the weblike material upstream of the roll in the completion phase in the winding-up system.

2. Machine as claimed in claim 1, characterized in that said winding-up system comprises a peripheral winding-up cradle.

15 3. Machine as claimed in claim 1 or 2, characterized in that said adhesive applicator applies the adhesive to the weblike material before said weblike material is severed by the severing system.

4. Machine as claimed in claim 2 or 3, characterized in that said adhesive applicator is disposed upstream of the winding-up cradle.

20 5. Machine as claimed in one or more of the preceding claims, characterized in that said adhesive applicator comprises one or more nozzles.

6. Machine as claimed in one or more of the preceding claims, characterized in that said winding-up cradle comprises at least one winding-up roller onto which the weblike material is passed, and in that said adhesive applicator is disposed, relative to said first winding-up roller, in a manner such as to apply the adhesive to the weblike material which is supported on said winding-up roller and passed around the latter.

25 7. Machine as claimed in one or more of the preceding claims, characterized in that it comprises an embossing unit with two embossing cylinders and two associated pressure rollers, said embossing unit being supported by side frames which also support the winding-up cradle.

30 8. Machine as claimed in claim 7, characterized in that the

embossing cylinders are placed one above the other vertically, with a first embossing cylinder placed above the second embossing cylinder, and in that the pressure rollers are positioned with the first above the first embossing cylinder and the second below the second embossing cylinder, offset laterally
5 relative to a plane containing the axes of the two embossing cylinders, the winding-up cradle being situated, relative to said plane, on the side opposite the second pressure roller.

9. Machine as claimed in claim 8, characterized in that it comprises an adhesive dispensing unit associated with the first embossing cylinder,
10 disposed above said second pressure roller.

10. Machine as claimed in claim 7, 8 or 9, characterized in that it comprises a laminating roller interacting with one of said embossing cylinders.

11. Machine as claimed in one or more of the preceding claims,
15 characterized in that it comprises a ply-bonding unit.

12. Machine as claimed in claim 11, characterized in that said ply-bonding unit is positioned above the winding-up cradle.

13. Machine as claimed in one or more of the preceding claims, characterized in that it comprises a printing unit.

20 14. Machine as claimed in one or more of the preceding claims, characterized in that it comprises a means for introducing winding-up cores, on which said rolls are wound up, and in that, on completion of the winding-up of each roll, said adhesive applicator applies the adhesive to said weblike material in two successive areas, in the first area in order to seal the final free
25 edge of each roll and in the second area to anchor the initial free edge to a winding-up core.

15. A method for the production of rolls of wound-up weblike material, in which, on completion of the winding-up of a roll, the weblike material is severed, creating a final free edge to be wound up onto the
30 completed roll and an initial free edge for the initiation of the winding-up of a subsequent roll, characterized in that, by means of an adhesive applicator, said adhesive is applied to the weblike material upstream of the roll in a completion phase.

16. Method as claimed in claim 15, characterized in that said roll is wound up in a peripheral winding-up system.

17. Method as claimed in claim 15 or 16, characterized in that the adhesive is applied to the weblike material before said weblike material is severed in order to create said initial edge and said final edge.

18. Method as claimed in one or more of claims 15 to 17, characterized in that said adhesive is applied by spraying.

19. Method as claimed in one or more of claims 15 to 18, characterized in that the weblike material is fed to a peripheral winding-up cradle comprising at least one winding-up roller, and in that the adhesive is applied to the weblike material while the latter is being passed around said first embossing cylinder and supported thereby.

20. Method as claimed in one or more of the preceding claims, characterized in that two areas of adhesive are applied, by means of a single applicator, to the weblike material, a first zone corresponding to the final free edge and a second zone corresponding to the initial free edge, the initial free edge being anchored by said adhesive on a winding-up core to initiate the winding-up of the subsequent roll.

21. A peripheral rewinding machine comprising a winding-up system and an embossing and laminating unit having a first and a second embossing cylinder with which a first and a second pressure roller interact, characterized in that the embossing cylinders are placed one above the other vertically, with the first embossing cylinder placed above the second embossing cylinder, and in that the pressure rollers are positioned with the first above the first embossing cylinder and the second below the second embossing cylinder, offset laterally relative to a plane containing the axes of the two embossing cylinders, the winding-up system being situated, relative to said plane, on the side opposite the second pressure roller.

22. Machine as claimed in claim 21, characterized in that it comprises an adhesive dispensing unit associated with the first embossing cylinder, disposed above said second pressure roller.

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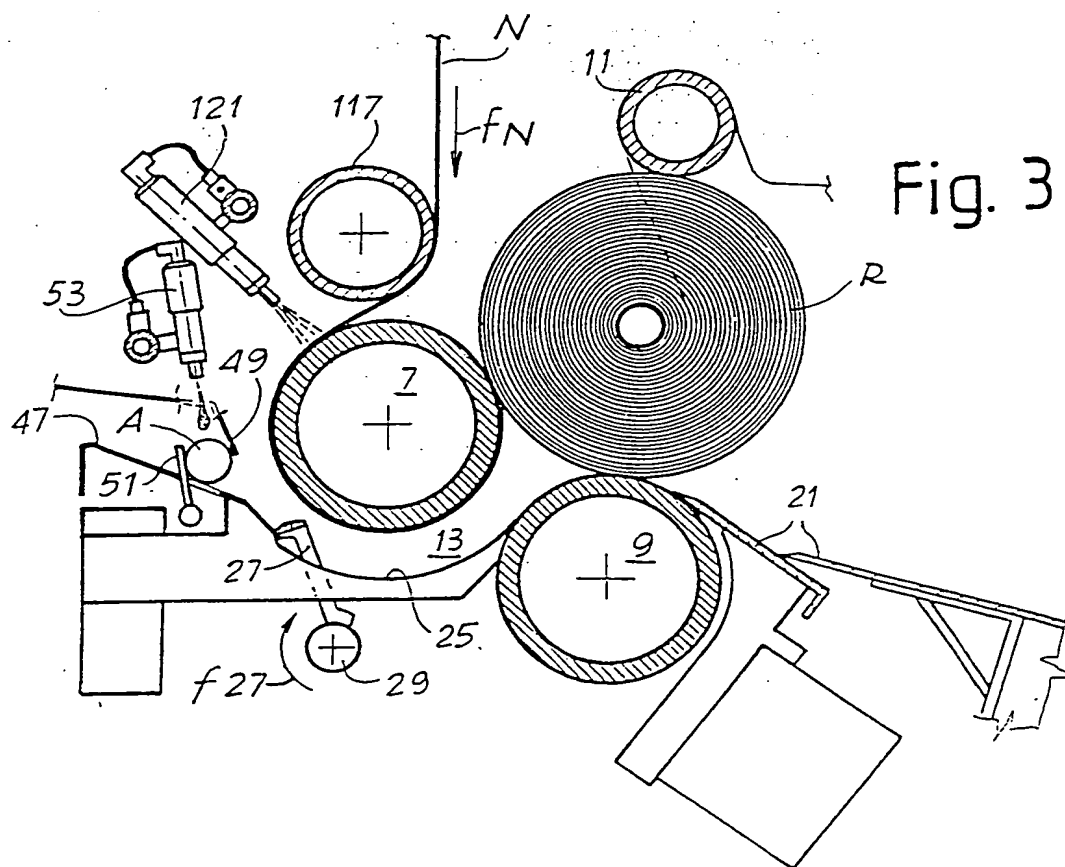
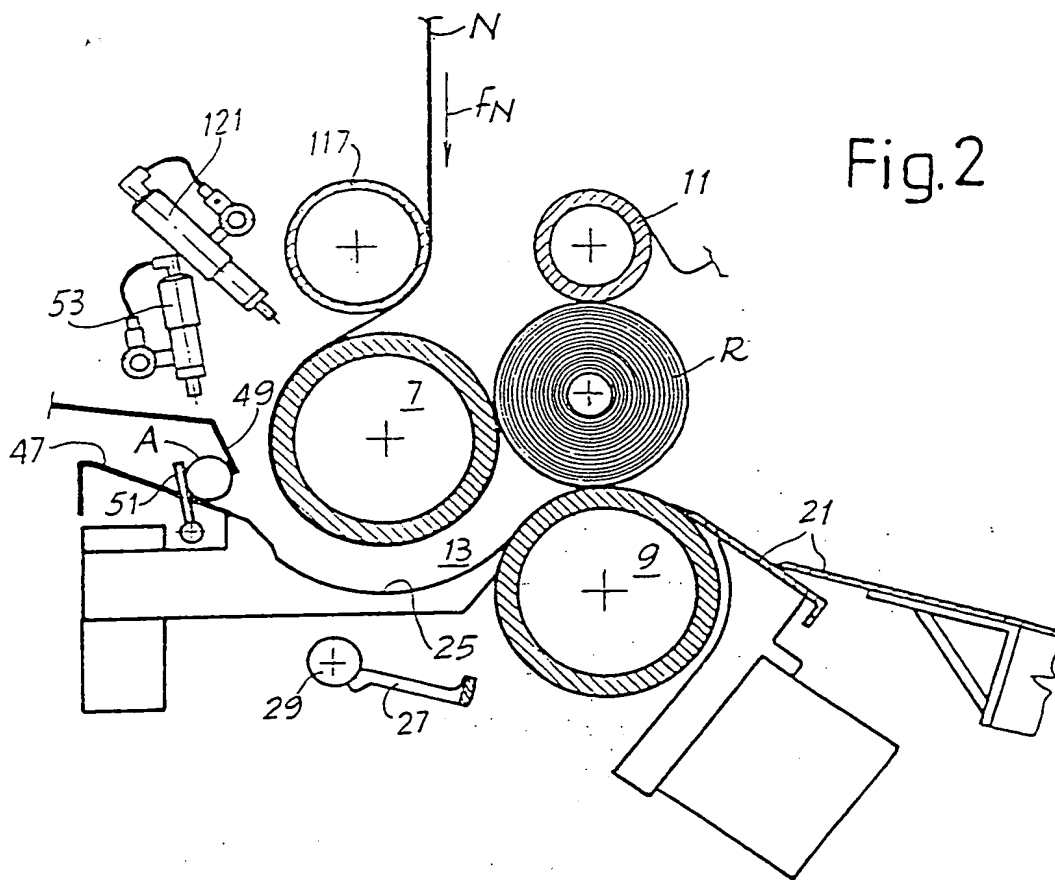
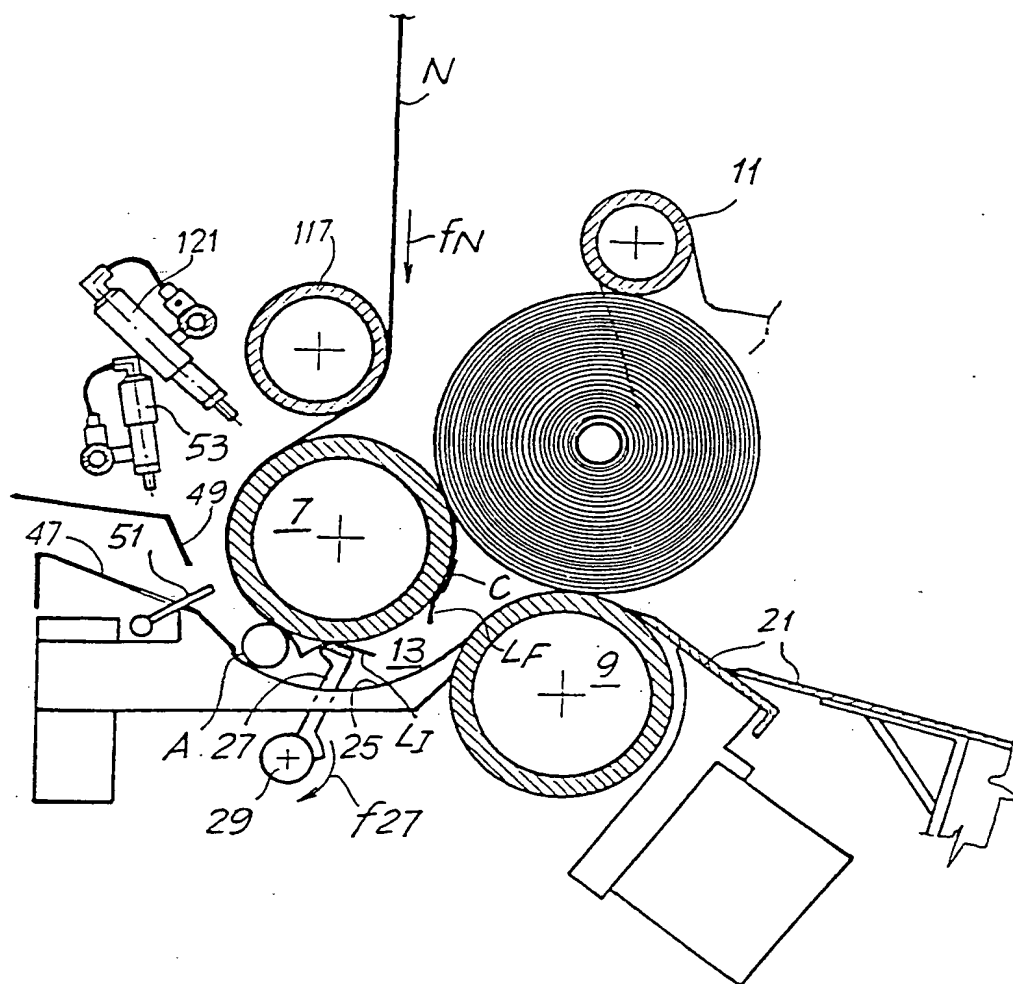


Fig. 4



INTERNATIONAL SEARCH REPORT

International Application No

PCT 01/00095

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 B65H19/29 B31F1/07

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC 7 B65H B31F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 5 092 533 A (GANGEMI DONALD) 3 March 1992 (1992-03-03) column 4, line 23 - line 52 figures 1-4	1-5, 14-18, 20 6, 19
X	US 4 775 110 A (WELP EWALD G ET AL) 4 October 1988 (1988-10-04) column 4, line 42 - line 64 column 5, line 56 - line 68 figures 1, 3	1, 2, 4-6, 14-16, 18-20
X	US 5 413 656 A (KUEHNHOLD MICHAEL ET AL) 9 May 1995 (1995-05-09) the whole document	1-4, 6, 14-17, 19, 20
	-/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

14 June 2002

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INTERNATIONAL SEARCH REPORT

International Application No

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 934 895 A (VOITH SULZER PAPIERTECH PATENT) 11 August 1999 (1999-08-11) column 5, line 40 -column 6, line 3 column 7, line 35 - line 42 figures 1-4 ----	1-4,6, 15-17,19
A	WO 94 21545 A (PERINI EVA ;PERINI FABIO SPA (IT)) 29 September 1994 (1994-09-29) cited in the application the whole document ----	
A	WO 99 41064 A (BIAGIOTTI GUGLIELMO ;PERINI FABIO SPA (IT)) 19 August 1999 (1999-08-19) the whole document ----	7,8,21
A	EP 0 796 727 A (JAMES RIVER CORP) 24 September 1997 (1997-09-24) column 8, line 24 - line 58 figure 4 ----	7,21
A	US 3 708 366 A (DONNELLY H) 2 January 1973 (1973-01-02) column 2, line 22 - line 27 ----	21
A	WO 97 32804 A (PERINI FABIO SPA ;BIAGIOTTI GUGLIELMO (IT)) 12 September 1997 (1997-09-12) cited in the application the whole document -----	7,21

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